

## 5 CLAIMS:

1. A multi frequency carrier transmitter comprising:

input means for receiving a plurality of different digital signals to be transmitted, said different signals to be transmitted on different carrier frequencies;

amplifier means for receiving a composite signal comprising said different signals at the respective carrier frequencies and amplifying said composite signal; and

predistortion means for predistorting said plurality of digital signals prior to amplification of the composite signal by said amplification means, said predistortion provided by said predistortion means being subsequently altered in dependence on the difference between said input signals and the output at said amplifier means.

2. A transmitter as claimed in claim 1, wherein said input means are arranged to separately receive each of said different signals.

3. A transmitter as claimed in claim 1 or 2, wherein combiner means are provided between the input means and the amplifier means for combining said plurality of different signals to provide a composite signal.

4. A transmitter as claimed in any preceding claim, wherein the predistortion means are arranged to predistort individually each of the plurality of different signals.

5. A transmitter as claimed in claim 4, wherein said predistortion means predistorts said signals before the plurality of different signals are combined by said combiner.

6. A transmitter as claimed in claim 3, wherein the predistortion means is arranged to predistort the composite signal after the plurality of signals have been combined by the combiner.

5 7. A transmitter as claimed in any one of the preceding claims comprising a feedback path arranged between the amplifying means and the predistorting means.

10 8. A transmitter as claimed in claim 7, wherein the predistorting means is arranged to compare the output from the amplifying means from the feedback path with the signals received by the receiving means and to provide, if necessary, at least one new predistortion value to be applied to at least one subsequent signal received by said receiving means.

15 9. A transmitter as claimed in claim 7 or 8, wherein means are provided in said feedback path for separating the output of the amplifying means into the plurality of different signals.

20 10. A transmitter as claimed in claim 9, wherein the predistorting means is arranged to compare each of said separated signals with the corresponding signal received from said input means and to determine if the at least one predistortion value needs to be altered.

25 11. A transmitter as claimed in claim 7, wherein said predistorting means is arranged to compare the composite signal from the amplifying means with the plurality of different signals to provide, if necessary, the at least one new predistortion value.

30 12. A transmitter as claimed in any preceding claim, wherein said predistortion means are arranged to provide a plurality of predistortion coefficients, at least one predistortion coefficient being provided for each multicarrier frequency.

35 13. A transmitter as claimed in claim 12, wherein said predistortion coefficients for each multicarrier frequency takes into account characteristics of other of said multicarrier frequencies.

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5 14. A transmitter as claimed in claim 13, wherein said characteristics comprise one or more of the following:  
frequency; and distortion.

10 15. A transmitter as claimed in any one of the preceding claims, wherein the amplifier means comprises a nonlinear amplifier.

16. A transmitter as claimed in claim 15, wherein said predistortion means is arranged to compensate for the nonlinearity of the phase and/or amplitude of the amplifier.

17. A transmitter as claimed in any one of the preceding claims, wherein digital to analogue convertor means are provided for converting said plurality of signals to analogue form before said signals are amplified by said amplifier means.

18. A transmitter as claimed in claim 8 or any claim appended thereto, wherein analogue to digital convertor means are provided for converting the output from the feedback path to digital format prior to the output of the feedback path being input to said predistorting means.

19. A transmitter as claimed in claim 9 or any claim appended thereto, wherein analogue to digital converter means are provided for converting the output of the feedback path to digital format prior to the separating means separating the output of the feedback path into a plurality of different signals.

20. A base station comprising a transmitter as claimed in any preceding claim.

21. A mobile station comprising a transmitter as claimed in any of claims 1 to 19.

22. A multi carrier frequency transmission method comprising the steps of:

receiving a plurality of different digital signals to be

5 transmitted, said different signals to be transmitted on different carrier frequencies;

combining said plurality of different signals to provide a composite signal comprising the different signals at the respective carrier frequencies; and

10 amplifying said composite signal, wherein the method further comprises the steps of:

predistorting the plurality of different digital signals prior to amplification of the composite signal by the amplification means; and

15 altering the predistortion applied to subsequent signals in dependence on the difference between said different signals and the amplified signal.